

<p><b>Institution: Newcastle University</b></p>
<p><b>Unit of Assessment: 28 Modern Languages and Linguistics</b></p>
<p><b>Title of case study:</b> Transforming clinical practice in aphasia: The Comprehensive Aphasia Test (CAT)</p>
<p><b>1. Summary of the impact</b></p> <p>The CAT is a unique clinical assessment for people with aphasia, combining assessment of language, cognitive skills and consideration of the wider effects of aphasia on people’s lives. On publication, it filled a gap in provision, providing a short but comprehensive assessment based on current theoretical understanding. It is now widely used by Speech and Language Therapists nationally and internationally, directing further assessment and informing diagnosis and treatment and therefore of benefit to people with aphasia. It has become the assessment of choice within clinical trials and projects investigating the relationship between language difficulties and lesion sites.</p> <p><b>2. Underpinning research</b></p> <p>Aphasia is a communication disorder following brain injury that can affect understanding of and production of spoken and written language, and has wide ranging impacts on everyday activities and a person’s wellbeing. Current estimates suggest there are 250,000 people in the UK with aphasia. A recent review (Code &amp; Petheram, 2011) states that (on the basis of the stroke data), the incidence of aphasia in the developed world ranges between 0.02–0.06% with prevalence ranging between 0.1–0.4%. Prior to the publication of CAT, Speech and Language Therapists (SLTs) working with people with aphasia had to use large scale assessment batteries based on research predominantly from the 1970’s or a collection of theoretically motivated tests (e.g. PALPA (Psycholinguistic Assessments of Language Processing in Aphasia)) which, whilst very useful, were never designed to be completed in full and required both time and extensive clinician skill in both selection and interpretation. The CAT represented a unique contribution to the field, allowing clinicians to assess people with aphasia with one test, carefully designed and based on current theoretical advances, which could be administered in its entirety to provide a clear profile of the person’s aphasia and its impact.</p> <p>The Comprehensive Aphasia Test (<b>1</b>) was developed over the period 1995-2003. CAT was a collaboration between David Howard (Research Development Professor, 1996 to current), Kate Swinburn (from Connect: a charity for people with aphasia), and Gillian Porter (an NHS therapist from Hertfordshire). The CAT was an innovation in aphasia assessment, uniquely drawing on both the increasing cognitive neuropsychological understanding of the factors that underlie the language difficulties of people with aphasia, and the need to consider the wider impacts of aphasia on people’s lives (based on principles of the World Health Organisation (WHO) International Classification Framework). The CAT aimed to draw together all relevant aspects of current research; this included longstanding contributions Howard had made to the field (examples include <b>4, 5</b>), particularly in relation to word retrieval as well as external research. Development of the CAT was a collaborative process, with Howard’s particular contributions leading on the design and subsequent analysis of the psychometric properties of the test, ensuring that the methods used allowed analysis of its reliability, validity and predictive power.</p> <p>The authors identify the advantages of the CAT as: i) Being comprehensive, as it assesses a wide range of language and neuropsychological impairments and the effect of the language impairment from the patient’s perspective; ii) Being clinically useful because it is brief; iii) Being a means of monitoring recovery and outcome; and iv) Being psychometrically well constructed in terms of reliability and validity (construct, predictive and concurrent) (<b>2, 3</b>).</p> <p><b>3. References to the research</b></p>
<p>1) Swinburn, K., Porter, G. &amp; Howard D (2004) <i>The Comprehensive Aphasia Test</i>. Hove;</p>

## Impact case study (REF3b)

Psychology Press. Can be supplied by the HEI on request

- 2) Howard, D., Swinburn, K., & Porter, G. (2010) Putting the CAT out: What the Comprehensive Aphasia Test has to offer. *Aphasiology*, 24(1): 56-74. REF2 Output: 153540.
- 3) Howard, D., Swinburn, K., & Porter, G. (2010) The CAT is now out: A response to the commentaries. *Aphasiology*, 24(1): 94-98. DOI:10.1080/02687030802453368
- 4) Nickels, L. A., & Howard, D. (2004) Dissociating effects of number of phonemes, number of syllables, and syllabic complexity on word production in aphasia: It's the number of phonemes that counts. *Cognitive Neuropsychology*, 21(1): 57-78. DOI:10.1080/02643290342000122
- 5) Bird, H., Howard, D., & Franklin, S. (2003) Verbs and nouns: the importance of being imageable. *Journal of Neurolinguistics*, 16(2-3): 113-149. DOI:10.1016/S0911-6044(02)00016-7

Outputs (2) and (3) are published in *Aphasiology*, the journal of choice for both academic and practising aphasia specialists. They have been subject to a rigorous peer review process.

### 4. Details of the impact

The CAT was a significant development in the assessment of people with aphasia. The CAT provides therapists with a unique, comprehensive, single test which gives a profile of relative strengths and weaknesses in patients' language processing; a way of assessing how other cognitive difficulties are impacting on their language, the likely course of recovery, and a means to assess how their aphasia impacts on their lives. At its publication, it was embedded within current theoretical understanding and continues to be accessible to clinicians. The CAT is now widely used in the UK and internationally by Speech and Language Therapists (SLTs) and researchers working with people with aphasia. The accessible format of the test and the comprehensive information obtained has resulted in its translation into a number of languages and its use in clinical trials and research projects.

#### 1. CAT sales/Distribution

Although there is a restricted market for tests such as these, the CAT has sold over 1600 copies worldwide (1459 of these sales since 2008) with significant sales in the UK and in other English speaking nations (Ireland/Australia/US) (**IMP1**). In 2003 Code and Heron identified 224 relevant SLT departments (i.e. working with an adult neurogenic population) in the UK. These may have more than one therapist within them, but it is common practice for one copy of an assessment to be bought for one department. In addition there are SLT training courses (n=22) in the UK and Ireland, researchers and a limited number of independent clinicians. With this in mind, CAT sales represent considerable reach. Following the development of the CAT, other researchers developed software to facilitate the scoring/interpretation of data (**IMP2**); this development reflects the widespread use of the CAT and the software has already sold approx. 90 copies since its publication in 2011. The accessible format and comprehensive information has resulted in the test being translated into Arabic and there is on-going work on a Dutch/Flemish and Spanish version, allowing the test to be used with non-English speakers. Given the extensive time, resources and expertise that are needed to translate CAT into different languages, this is indicative of CAT's significance for clinical practice and its value to practitioners (**IMP3**). The continued sales, use of existing tests and on-going translations ensure current and future impact for clinicians and the patients they work with.

#### 2. Impact on Speech and Language Therapists

Clinicians require a tool which facilitates rapid and reliable diagnosis of aphasia. Early reviews of CAT acknowledged the advantages set out by the authors, recognising the test as theoretically well-constructed and clinically feasible and as a useful tool for 'targeting therapy towards specific goals, which take due consideration of both the impairment and the participation level associated with aphasia' (p78i). It was identified as a valuable development in aphasia testing, 'useful in diagnosing the individual's impairment, assessing the overall severity of the language disorder and predicting and following changes in the severity of aphasia over time' (p89ii) (**IMP4**). The 'Disability Questionnaire' (DQ) (a section within the CAT) was one of the first objective measures of the wider impact of aphasia within the WHO framework of impairment, activity and participation. Concepts from the DQ have been taken forward within a more recent assessment, the Communication

## Impact case study (REF3b)

Disability Profile, and its authors describe the DQ as its 'forerunner'. The popularity of the CAT and interest about its psychometric properties is reflected in the fact that the 2010 article is one of the most read (top ten) Aphasiology articles accessed on-line (April 2013) (**IMP5**); Aphasiology is the foremost journal read by clinicians and researchers interested in language difficulties resulting from brain damage.

Whether the reported benefits of CAT had resulted in changes to clinical practice was considered via a focus group of SLTs in the North East of England (**IMP6**) and a survey to aphasia clinicians and researchers (**IMP7**). The focus group was led by 2 independent researchers and was part of a normal meeting of a specialist group of SLTs working with people with aphasia in hospitals and in community settings (May 2013). 17 people attended the meeting. Two groups considered questions about their use of the CAT, the sub-tests used, its strengths and weaknesses and its benefits to them and their patients, in the context of a wider discussion about current assessment practice. Within the focus group, people reported using the CAT (or sub-tests of it) as a starting point, guiding further more detailed assessment, particularly in a community setting. SLTs described using the results to inform diagnosis, direct further assessment, inform intervention and monitor overall progress across the aphasia pathway. The comprehensive nature of the CAT was considered its main strength, with therapists also reporting that it was easy to use and had clear instructions and scoring rules. Some individuals reported that it had benefited their practice/client care by providing a 'rounded' picture of clients' strengths and weaknesses (not just focusing on impairment/less chance of missing subtle impairments) and facilitating a smoother transition between different therapists (**IMP6**).

A survey was designed to consider the use and utility of language assessment in aphasia. People were asked about their work with people with aphasia, whether formal and informal assessments were used, what formal assessments were used and specific questions about the usefulness of a range of common assessments including the CAT. The survey was sent out via two independent researchers to mailing lists of specialist aphasia clinicians nationally and internationally. 243 responses were received; a high return rate considering the small number of potential recipients. 68% of respondents were based in the UK, with a range of postcodes reflecting national coverage. 32% of respondents were based internationally (including Finland, USA, Singapore, and Germany) with a high number from Australia and Ireland. Respondents were primarily clinicians with extensive experience (5-10 years or more) of working with people with aphasia (**IMP7**).

The survey revealed that over 80% of respondents were using the CAT (in whole or part) with an additional 10% reporting they would use if available. Over 75% of respondents agreed or strongly agreed that the CAT had 'benefitted me as a therapist' and that it 'yields useful information which helps in diagnosis', 'yields useful information which helps in goals setting' and 'yields useful information which helps in planning treatment'. The majority of participants were using sub-tests of CAT rather than using the test in its entirety. The benefits highlighted by individual respondents replicated those identified by the authors, reviewers and participants in the focus group: standardised, well-researched, quick and easy to use, comprehensive overview of strengths and weaknesses. Some of the benefits to people with aphasia were identified as: gives patient and family a realistic understanding of strengths and weaknesses, easy to use and easy to show outcomes. Respondents were using a range of other assessments alongside CAT, often to use sub-tests with more items or that allowed increased consideration of errors. There were a number of comments that suggested that the addition of CAT had changed their assessment practice. For example, "*I rarely use this (BDAE) now, preferring the CAT. I do sometimes use yes/no questions*"; and "*[PALPA provides] info on linguistic variables that help identify nature of the impairment and therapy planning, can be a next step if isolated difficulty on CAT but I use far less since CAT published*". The focus group and survey results show that the proposed use and advantages of the CAT are reflected in current clinical practice (**IMP7**).

An additional survey was sent to all of the SLT educational establishments in the UK and Ireland (n= 22). As with the main survey, the questionnaire asked about the CAT within the context of questions about other aphasia assessments, looking at student familiarity with assessments, their contribution to student learning, and the utility of the assessment. 12 responses were received,

including both undergraduate and postgraduate courses. All of the respondents said that students will be familiar with CAT both in the classroom and clinical practice. In addition, all of the respondents agreed or strongly agreed that the CAT 'contributes to student learning and knowledge of aphasia'. One respondent stated "*based on the cognitive neuropsychological model, it can help students come to grips with the model and practical aspects of clinical assessment*". Student familiarity with and use of the CAT means that the impact of CAT on clinical practice will continue to strengthen as the new generation of SLTs enter practice. The utility of CAT in assessment and diagnosis was reinforced by respondents, for example, "[It] allows the student to consider the main aspects of aphasia that need to be assessed, facilitates practice in obtaining a picture of client difficulties and abilities and sign-posts where further assessment is needed to gain a more indepth language profile, practice in differential diagnosis..." (IMP8).

### 3. Wider clinical impact

The comprehensive nature, reliability and validity of the CAT have made it one of the first choices for research studies about people with aphasia. Aphasia therapy research is at a transitional stage, moving from a weaker evidence base (single case studies, case series) to a more robust base of group studies and randomised control trials. Diagnostically, the CAT has been used in many recent single case studies and case series, providing a language profile for participants, allowing clinicians to select effective treatments for individuals with a similar profile. Of greater significance, the CAT is currently being used as the outcome measure in a number of larger trials. For example, 'Aphasia Language and Functional Intervention (LIFT), Australia, and 'Programme for Intensive Residential Aphasia Treatment' (PIRATE), U.S.A. (IMP9). These studies are crucial for continuing to develop the evidence base for the benefits of speech and language therapy for people with aphasia and will influence clinical practice. The CAT is also been used by a team of researchers creating a database of people with aphasia containing information about their language and cognitive skills and linking this to the site of their brain lesion, with the ultimate aim of making predictions about recovery (IMP10). This is an innovative and ambitious study, using the CAT as the primary assessment method. This project is of importance to the field as better information about likely prognosis will be of great clinical significance.

### 5. Sources to corroborate the impact

- (IMP1) Sales of CAT. Available on request.
- (IMP2) Software for scoring: Keith, R. & Croot, E. (2011) *Scoring software for the Comprehensive Aphasia Test*. London: Psychology Press.
- (IMP3) Translations of CAT. Available on request.
- (IMP4) Forum Commentaries on CAT. i) Springer, L. & Mantey, S. (2010): The Comprehensive Aphasia Test: A review. Commentary on Howard, Swinburn, and Porter, "Putting the CAT out: What the Comprehensive Aphasia Test has to offer", *Aphasiology*, 24:1, 75-78. DOI: 10.1080/02687030802453301 ii) Bruce, C. & Edmundson, A. (2010) Letting the CAT out of the bag: A review of the Comprehensive Aphasia Test. Commentary on Howard, Swinburn, and Porter, "Putting the CAT out: What the Comprehensive Aphasia Test has to offer". *Aphasiology*, 24, 79-93. DOI: 10.1080/02687030802453335
- (IMP5) Howard et al. (2010) Putting the CAT out. In top 10 most read articles in *Aphasiology* (April 2013).
- (IMP6) Agreed summary of focus group of aphasia therapists in North East of England.
- (IMP7) Survey of aphasia therapists (nationally and internationally). Results available on request.
- (IMP8) Survey of HEIs in UK and Ireland who have SLT courses. Results available on request.
- (IMP9) Aphasia LIFT (Language Impairment and Functional Therapy) as an example of use of CAT within research. Rodriguez, A.D et al. "Aphasia Lift: Exploratory Investigation of an Intensive Comprehensive Aphasia Programme." *Aphasiology*, (2013). DOI:10.1080/02687038.2013.825759
- (IMP10) Hope, T.M.H., Seghier, M.L., Leff, A.P. & Price, C.J. (2013) Predicting outcome and recovery after stroke with lesions extracted from MRI images. *NeuroImage*, 424-433. DOI: 10.1016/j.neuroimage.2013.03.005